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THE FLAX GROWER IN POSTWAR AGRICULTURE

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Reserve

The impact of World War II on agriculture in the United States has forced the American farmer to shift from his usual cropping pattern. One part of this shift has been an extraordinary expansion of the flaxseed acreage to help meet the great demand resulting from our high wartime emergency requirements.

The extent of this contribution to our war effort by the American farmer is well known by all of us and is shown by the data in table 1.

Table 1. Planted flaxseed acreage in selected States and for the United States, by years, average 1935-39 and annually 1942 through 1945

Area	Acreage					Percentage of 1935-39 average				
	1935-39	1942	1943	1944	1945	1935-39	1942	1943	1944	1945
	1/	2/	1/	2/	2/				1/	2/
	1,000	1,000	1,000	1,000	1,000					
	acres	acres	acres	acres	acres	Pct.	Pct.	Pct.	Pct.	Pct.
United States	1,938	4,715	6,299	3,052	4,149	100	243	325	157	214
Dakota-Montana area	983	2,159	3,395	1,525	2,442	100	220	345	155	248
Minnesota	755	1,674	1,758	914	1,197	100	222	233	121	159
California	58	207	310	170	117	100	357	534	293	202
Iowa	32	262	330	122	123	100	819	1,031	381	384

1/ Preliminary.

2/ July 1, 1945 indications.

The increase in the production of flaxseed during the war years has been even greater than the increase in acreage because of the higher average yields during these years. The marked adjustment in acreage was only attained through significant shifts in cropping patterns in the flax producing areas.

When the international situation again becomes stabilized, foreign supplies of linseed oil and other drying oils may be more readily available once more. The purpose of our current economic study of flaxseed is to analyze the postwar position of flaxseed and its joint products, under several alternative sets of assumed supply and demand situations. This will help in determining whether the acreage of flaxseed in the United States has been overextended in recent years from the postwar point-of-view and, if so, where and to what extent.

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For an adequate attainment of this objective it is desirable to approximate the geographic distribution of flaxseed acreage which will be associated with a pattern of total farm production yielding the highest economic returns to farmers. This analysis of the economic position of flaxseed is an essential part of a thorough appraisal of the pattern of the future agricultural production in those States in which there is a sizable flaxseed acreage. Such studies may well serve as guideposts in the formulation of agricultural production adjustment policies for the future.

Postwar Outlook for Flaxseed

As a preliminary part of this study, the B.A.E., in cooperation with the State colleges, conducted a field survey in the major flaxseed producing areas in North and South Dakota, Minnesota, Montana, California, and Kansas. Over 200 farmers who had at least 2 years experience in growing flax were interviewed this last summer. Questions on the following items were included in the schedule.

- (1) Quantities and cash expenses for materials used in the production of flaxseed and alternative crops.
- (2) Main factors affecting yields of flaxseed and how yields can best be increased.
- (3) Each farmer's future intentions with respect to flaxseed.
- (4) Factors which were considered to be most important in affecting future flaxseed acreage.

In addition to visiting farmers, information was obtained from discussions with members of State college staffs. Data from a number of earlier studies were also obtained in each State.

We are now in the process of summarizing and analyzing the data which were assembled. As this task has not been completed I would like to preface my remarks by stating that what is now to be presented is in preliminary form and is quite subject to change.

As previously indicated we asked the farmers what factors they considered to be most important in affecting the acreage they would plant to flaxseed in the future. We also asked them what would be their flaxseed acreage response to various sets of assumed supply and demand situations. I will attempt to summarize briefly for you the answers which were given to these two questions. It is my opinion that these answers supply one of the keys to the riddle "what is the postwar outlook for flaxseed?"

Factors which will influence flaxseed acreage in the postwar (1950-55) period. (1) The future yield of flaxseed will be one of the more important factors in determining the future acreage of flaxseed in most areas of the United States according to the farmers interviewed. The development and wider adoption of new disease resistant and higher yielding varieties is one way of insuring a more stable and higher acreage of flax. Such varieties of flaxseed as Renew and Arrow, which have been recommended for Montana by the State College will tend to improve the competitive position of flax with its alternatives. However, as yet very few farmers in northeastern Montana have adopted either of these varieties. There are two reasons for this as I see it—the most important one being that enough seed has not been available during the last year or two.

A second reason is that a surprising proportion of the farmers in that area (with whom we came in contact) had heard little of either variety. Similar experiences in other States were encountered.

More effective weed control through improved cultural practices and through the wider use of such recommended chemicals as sinox show much promise for increasing flaxseed yields in all areas. Farmers indicated that if they were able to control weeds their flaxseed yields would be from 2 to 7 bushels higher per planted acre. This represents a possible increase in flaxseed yields through weed control alone of from about 20 percent to as much as 70 percent, and perhaps higher in some areas. Experimental results from the State colleges show similar conclusions. Effective weed control will improve the competitive position of flaxseed in three ways. First, it will mean higher proportional yield increases in flaxseed than in the competitive crops since weeds cut down flaxseed yields more than on other crops. Secondly, it will make the flaxseed crop easier to handle. The main objection most farmers had against growing flax was the difficulty of harvesting the crop and the weedy condition it left their fields in. Third, it will leave clean straw which will have a higher sales value.

(2) The wider adoption of improved machinery, especially swathers and combines, may have a pronounced effect on the future acreage planted to flaxseed. Farmers in California indicated that the new self-propelled combines with the rubber rollers were apparently more efficient in harvesting flaxseed than the machines which they have been using in the past.

Farmers in southwestern Minnesota indicated that they probably were using combines which were too small, or were picking up a larger swath from the windrow than their combines could most efficiently handle.

(3) There are many other factors (in addition to weather) of which you are all aware that will have an effect in determining the future acreage of flaxseed. The use of flaxseed as a nurse crop; the place of flaxseed in the labor calendar—in most areas flax fits into the labor distribution very effectively; diversification of risk; rising trends in livestock numbers, with the resultant need for increased feed production; governmental programs such as acreage restrictions for competitive crops; more uses and hence higher sales price of flax straw. These were the factors given most frequently by the farmers as being the most important considerations in determining the acreage which they would plant to flax.

(4) One last factor which has a definite bearing on the acreage planted to flaxseed is the price the farmers receive for their flaxseed as compared with wheat or other alternative crops. However, price itself may not always be as important in determining flaxseed acreage as several of the other factors already mentioned. In the spring of 1945 farmers were assured of a favorable price situation for flaxseed and yet planted less than 70 percent as much flaxseed as in 1943 when the price situation was less favorable. If a farmer cannot get consistently satisfactory yields of a given crop he will tend to reduce his acreage of that crop no matter what the price is. This has been especially true for flaxseed since most farmers consider it to be such a risky crop. In other words the expected net income per acre is the important factor farmers consider in working out their cropping pattern.

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Farmers' indications of flaxseed acreage under three price assumptions.

One of the questions farmers were asked in the survey was: "What are your future intentions with respect to planting flaxseed?" This question was asked on the basis of three sets of assumed prices for flaxseed as compared with a given price for wheat (or the major alternative crop). Such factors as weather, yields, etc., were assumed to reflect average conditions. Of course most farmers in answering this question gave some consideration to these factors (weather, yield, etc.) rather than assuming price to be the sole factor in determining the acreage they may plant to flaxseed. The three sets of prices used varied from State to State in accordance with the usual price differentials. For the United States the prices assumed were: Flaxseed \$1.65 and wheat \$1.10 (1.5 to 1.0 ratio); flaxseed \$2.20 and wheat \$1.10 (2.0 to 1.0 ratio); flaxseed \$2.75 and wheat \$ 1.10 (2.5 to 1.0 ratio). These were the most usual price ratios during the 1910-44 period.

A national estimate on the basis of the farmers' replies would indicate a flaxseed planting of: About 900,000 acres under the 1.5 to 1.0 ratio; about 2.5 million acres under the 2.0 to 1.0 ratio; and about 3.5 million acres under the 2.5 to 1.0 ratio. These figures roughly refer to the time period after 1950. It was assumed that by 1950 the immediate reconversion period would have passed and some sort of a new level of stability would have been reached. Thus the farmers in the United States would be tending toward a long-time cropping pattern.

The price ratio of flaxseed to wheat in the past has not remained constant for a sufficiently long period of time to get a theoretically perfect acreage response to it. However, comparisons of the price ratio of flax to wheat of one year, with the acreage planted to flax the following year, give a rough measure of farmers' historical flaxseed acreage response to the price ratio. This was done for the period 1910-44 for the United States with the following results: Under the 1.5 to 1.0 price ratio the acreage was just under 2 million acres; with the 2.0 to 1.0 ratio it was about 2.9 million acres; and with the 2.5 to 1.0 ratio it was just over 3.0 million acres.

Another set of estimates of flaxseed acreage response to price was that made in 1944 by the State production adjustment committees for the postwar period. These State committees estimated what the 1950 flaxseed acreage would be under the price ratio of 2.0 to 1.0 with the flaxseed price at \$2.20 and wheat at \$1.10. This estimate was about 2.8 million acres as compared with the estimate of about 2.5 million acres on the basis of the farmers' replies in this study.

Summarizing these acreage estimates one can say that with a price ratio of about 1.5 to 1.0, the acreage planted to flaxseed in the United States might be as low as one million acres or about the same as during such years as 1921, 1922, and 1938. If the price ratio were 2.0 to 1.0 then there might be somewhere between 2.3 to 3.0 million acres or about the same acreage as from 1926 through 1928, or in 1936. Should the price ratio be 2.5 to 1.0, then from 3.0 to 4.0 million acres of flax might be planted, or about the same acreage as in the years 1940, 1941, and 1945. These estimates are not to be regarded as predictions or forecasts but as judgments which were intended to be consistent with the three assumed price situations.

International trade in flaxseed and oils in the postwar period. The United States is the fourth largest producer of flaxseed in the world, being surpassed by Argentina, the Soviet Union, and India. World production of flaxseed has been almost constant since 1920, averaging around 140 million bushels. Production in the United States during the 1920-45 period has ranged from a low of 5.3 million bushels in 1936 to about 52.0 million bushels in 1943, averaging approximately 16 million bushels. This represents less than one-eighth of the world production. The United States imported over 20 percent more flax than it produced annually during the years 1921 through 1939.

Linseed oil, the main product from flaxseed, is one of the principal vegetable oils in the world. It is used both for food and industrial purposes. It is used extensively for food purposes in India and the Soviet Union. In the United States we use linseed oil almost exclusively for such industrial products as paints, varnishes, linoleum, oil cloth, printing ink, etc. It is usually the cheapest of the drying oils available for the manufacture of these commodities. Other oils, such as perilla and tung are of higher quality but are available only in limited quantities. Perilla oil mixed with soybean oil has been used as a substitute for linseed oil. During the war dehydrated castor oil has become an important substitute for the more expensive drying oils. It may be used more extensively in the United States in the future if the castor bean plant can be bred to fit machine processes.

International trade in flaxseed and linseed oils is relatively heavy. More than one-half of the world production normally is exported, mostly as flaxseed rather than oil. The principal exporter is Argentina which ships out about 90 percent of its production. It provides at least 80 percent of the world's total exports during normal times. India and Uruguay are next in importance from the standpoint of total export. Despite a relatively large production of flaxseed neither the United States nor the Soviet Union has any surpluses available for export. As was previously mentioned the United States is a heavy importer of flaxseed, being one of the world's largest importers. Canada, formerly an important exporter, practically disappeared from the world export market during the thirties because of her reduced production. Canada may regain her former place under more favorable weather conditions.

A large secondary trade existed in linseed oil before the war. The Netherlands, Germany, Belgium, and the United Kingdom imported and crushed large quantities of flaxseed. The oil was then refined and a large part re-exported while most of the linseed meal was fed to livestock. This trade probably will be reestablished after this war as Argentina and Uruguay are likely to find this more profitable than crushing the flaxseed at home. It does not appear probable that the Argentine farmer can compete with the European livestock producer in the purchase of linseed meal. This might have the tendency to support the prices of flaxseed and linseed oil on the world markets. The European countries will not only have a strong demand for linseed oil but the linseed meal will be important to them as a protein supplement feed for their livestock.

What will the import situation for flaxseed and linseed oil be in the United States in the postwar era? Most of the flaxseed imported by the United States originates in Argentina. The trade agreement between the United States and Argentina, currently in effect, provides among other things for a duty on flaxseed of 50 cents per bushel, and to be 32.5 cents per bushel for the

duration of the existing abnormal situation in the flaxseed trade. The temporary reduction to 32.5 cents will terminate 30 days after the President of the United States, following consultation with the Argentine Government, proclaims that the abnormal situation is passed. The President now has authority to reduce further the tariff duty to 25 cents per bushel. This was granted to him under the recently passed Reciprocal Trade Agreements Act. The "price incidence" of a duty or tax on imports ordinarily is borne in part by the importer and in part by the exporter. The extent to which the various duties and taxes have been effective in supporting prices in the United States is not accurately known. It is known, however, that flaxseed prices have been raised considerably more in the United States as a result of the duty than they have been lowered in Argentina.

What our trade policy toward the Argentine in the postwar years will be is not presently known. We can assume, however, that the Argentine will have flaxseed to export. There may be a potentially strong demand for Argentine flaxseed in the European countries in the future. This, in itself, will tend to support the prices of both flaxseed and linseed oil on the world markets. It is quite possible that the potentially strong demand for linseed oil in the United States in the future will be a more important factor in maintaining domestic flaxseed prices than will any tariff. Let us consider briefly some of the demand factors affecting the future of flaxseed production in the United States.

Some demand factors affecting the future of flaxseed production in the United States. There are several economic factors which will affect the future demand for the varied products derived from flaxseed. The immediate postwar outlook for flaxseed and linseed oil appears bright. Remarks about the future are directed beyond the immediate and toward the 1950-55 period, as being more representative of the postwar era after the conversion period.

One factor affecting future demand which is sometimes overlooked is our ever increasing population.. Population authorities estimate that the population in the United States will be approximately 14 percent higher in 1953 than it was in the 1935-39 period. There is also apparent an increasing trend in the domestic per capita consumption of linseed oil in the United States since 1930. Assuming this trend continues, it, together with the 14 percent larger population, will exert a strong force on the United States demand for linseed oil during this period.

An increasing population and a rising trend in per capita consumption do not take into account any change in the rate of construction activity in the postwar years over the prewar years. Various estimates of the annual number of new residential housing units to be built in the first decade after the war have been made. One of these estimates appeared in the book "American Housing," published in 1944 by the Twentieth Century Fund Survey. They estimated the annual number of new residential housing units to be built in the postwar period as being about $1\frac{1}{4}$ million nonfarm residential units, associated with a national income of 100 billion dollars (a conservative estimate of national income for 1950). This compares with previous building rates about as follows: In 1925, during the building peak, it was 937,000 units; the 1935-39 prewar 5-year average was only 359,000; 1941, a war year, saw the rate increase to 715,000. Such an estimate seems reasonably conservative when one considers the much larger backlog of unsatisfied housing demand and the greater arrears in maintenance so evident now that the war is over.

This estimated volume of new nonfarm residential construction is more than three times that of 1935-39. This does not mean that the consumption of paints and varnishes will be correspondingly increased. In 1940 about three-fourths of the paint and varnish used in construction was for maintenance purposes. Presumably the maintenance demand will not rise as much as the new construction demand. But these two factors will tend to cause a higher demand for linseed oil. New construction also will tend to increase the demand for linoleum and oil cloth, since the consumption of these products is closely associated with building activity.

Another factor in the postwar demand for paints and varnishes grows out of the war itself. The permanent governmental demand for maintenance purposes has been considerably increased. The maintenance of a permanently larger than prewar Navy will be a continuing factor. Perhaps, a somewhat larger merchant marine will also be an element.

New uses for linseed oil will also increase its consumption, in addition to whatever expansion there is in the demand for other products using it.

The future picture for flaxseed is not all rosy. Flaxseed appears to have lost some ground in the overall world demand in recent decades because of the rise in importance of other drying oils. The greater possibilities of substitution now present also afford more competition with such oils as those processed from soybeans. Competition from plastics, compressed woods, and other such items, which may reduce the future need for linseed oil, must not be overlooked. Improvements in varieties of alternative crops (such as hybrid corn, Vicland oats, Newthatch wheat) apparently have been more pronounced than those in the newer varieties of flaxseed which have been adopted. Thus it behooves the research men to continue their efforts to provide means of controlling weeds more effectively, to get more of the highest yielding flax varieties adopted and to continue their work in developing greater resistance to flax diseases if farmers in the United States are to find flaxseed profitable.

